Experimental Histories of Culture
Author(s): Edward Rose and William Felton
Source: *American Sociological Review*, Vol. 20, No. 4 (Aug., 1955), pp. 383-392
Published by: American Sociological Association
Stable URL: http://www.jstor.org/stable/2092735
Accessed: 31-01-2016 04:36 UTC

REFERENCES
Linked references are available on JSTOR for this article:
http://www.jstor.org/stable/2092735?seq=1&cid=pdf-reference#references_tab_contents

You may need to log in to JSTOR to access the linked references.

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at http://www.jstor.org/page/info/about/policies/terms.jsp

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Sage Publications, Inc. and American Sociological Association are collaborating with JSTOR to digitize, preserve and extend access to *American Sociological Review*.

http://www.jstor.org

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

American
SOCIOLOGICAL
Review

August
1955

Volume 20
Number 4

Official Journal of the American Sociological Society

EXPERIMENTAL HISTORIES OF CULTURE

EDWARD ROSE AND WILLIAM FELTON
University of Colorado

A SHORT while ago Guy E. Swanson published a report on the production in the laboratory of crowds that consisted of only three people.[1] His paper offered evidence that the behavior of crowds of all sizes can be expressed in the behavior of three people acting under controlled conditions. His most important control, that which made possible direct and repeated examination of crowd phenomena, was, of course, this drastic restriction on the size of his experimental groups. The elegance of his studies followed from the reduction of social facts to manageable and yet sufficient magnitudes that made for efficiency in observation and analysis.

Here is a description of certain laboratory studies of culture that employed similar techniques of limitation upon field phenomena through laboratory controls. We dealt with laboratory populations that were barely large enough and that assembled in just enough sessions long enough to allow enough communication to make for the rudimentary expression of certain shared experiences that qualify as culture. Our aim was not to bring about an image, but rather the actualization of culture out of experimental transactions.

We sought to produce culture in the laboratory and to specify some of its experimental operations. And we were interested in how such operations as invention and culture borrowing could go to make up various culture histories in the laboratory. Finally, we made use of these laboratory histories to test some ideas about culture.

[1] "A Preliminary Laboratory Study of the Acting Crowd," *American Sociological Review,* 18 (October, 1953), pp. 522–533.

THE EXPERIMENTAL PRODUCTION OF CULTURE

Culture is a term that has been assigned many meanings.[2] The one meaning that we attempted to induce experimentally was the generalization in Tylor's original definition: ". . . capabilities and habits acquired by man as a member of society."[3] This is a statement of one of the simplest arrangements for inquiry: an independent variable of social membership and a dependent variable of "capabilities and habits." The study of culture as thus defined calls for observations of the dependence of "habits" on memberships in "societies."

To produce culture we conducted a series of group Rorschach experiments. We asked small groups of people to examine together certain inkblot cards and to tell one another what could be seen in the cards. These groups met during a series of brief sessions. Each successive session called for the examination and discussion of several inkblot cards that had been seen and talked about in preceding sessions. It was thus possible for any person to copy—or, if he chose, not to copy—Rorschach responses previously made public by others or by himself. Our labora-

[2] See A. L. Kroeber and C. Kluckhohn, "Culture: A Critical Review of Concepts and Definitions," *Papers of the Peabody Museum of American Archaeology and Ethnology,* Vol. 67, No. 1, 1952.

[3] *Primitive Culture,* London: John Murray, 1873, Second Edition, Vol. 1, p. 1.

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

tory culture consisted, accordingly, of a disjunct collection of copied, public ideas freely brought forth and freely handed on throughout small experimental populations.

In each experiment a population was divided into several completely separated small groups that were put through the performance of responding simultaneously and repeatedly to identical inkblot cards during a series of co-ordinated sessions. As each experiment progressed, the memberships of the separated groups were rearranged at certain intervals. Thus a Rorschach response could be *invented* and discussed in one group, copied and thus *borrowed* by other members of that group, or repeated as a *habit* by the original inventor, or perhaps by a borrower, and ultimately, with an interchange of group members, diffused to other groups where it might be borrowed by still other subjects. Through these processes of invention, borrowing, and habitual repetition, certain responses reached wide distribution.

The words, "invention," "borrowing," and "habit," designate observable operations in the experiments. When a person copied his own previous responses, he displayed habit. When he copied the previous responses of others, he displayed borrowing. When he pointed to something new, to some figure in the Rorschach cards not previously brought to notice, he displayed invention. We found it useful to distinguish as a separate sort of response, habits that had originated as borrowings. Responses that were thus both borrowings and habits we have called *culbits*. A literal reading of Tylor's definition would confine culture to culbits, to socially acquired habits. A more serviceable rendering extends the term to all four operations, for *the four are not different behaviors* as immediately observed and recorded, but are different sorts of events in cultural processes. We called all of these operations cultural responses. Our experiments explored the dependence of these particular responses on membership in laboratory societies.

SOCIETY AND HISTORY

Our experimental cultures were structurally primitive. One response might suggest another, but never required its public expression. The cultures were collections, not systems. The induction of such simple cultures required in turn some simple arrangements of social situations.

In each of the experiments described here cultural processes were induced in three separate groups of three persons each during the course of seven to nine periods that lasted sixteen minutes each. We have used the terms, *society* and *epoch*, to designate groups and periods in order to specify the two historical features—social and temporal separations—that were expressly built into our experimental models.

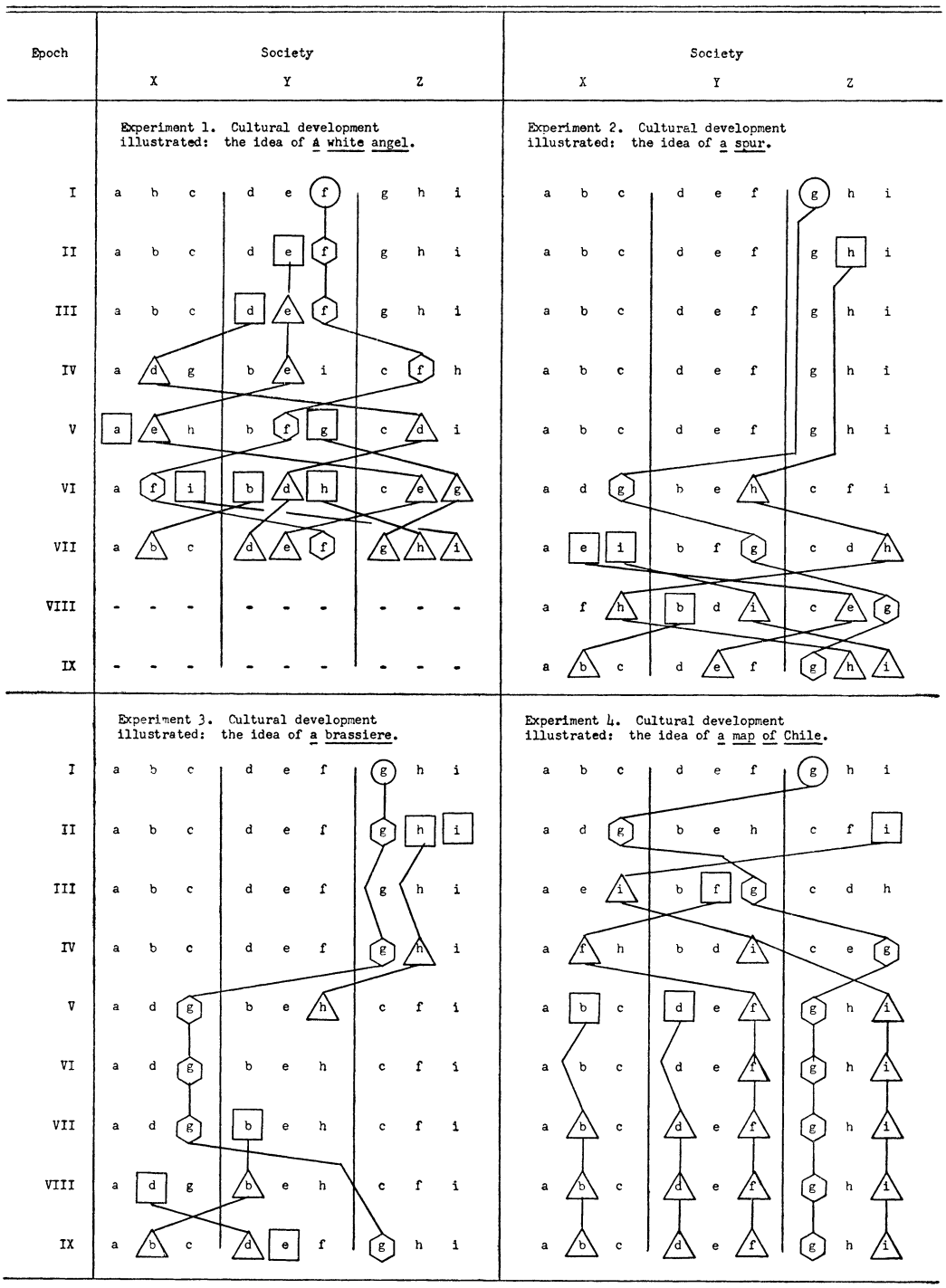
To call a few minutes epochs and tiny groups societies violates the full meaning and intent of these terms. But we followed common laboratory practices of abstracting and reducing phenomena to manageable limits. We tried to include in our laboratory models no more than was necessary to bring forth the sorts of events that were of interest to us. And so we worked with such minimal operating definitions of societies and of historical epochs as would allow the investigation of certain simple effects of society on culture. Society and epoch describe the principal controls of the experiments, controls over memberships and over periods of social and cultural experience. An array of societies undertaking tasks of cultural response through a series of epochs make up what we have called experimental histories. Table 1 records the designs of our experimental histories.

Table 1 illustrates four experimental histories and four (out of many) cultural developments. In this table the various culture responses are associated by their respective symbols with particular persons located in the separate societies. Careful examination of the memberships of the societies will disclose various combinations of *closed* and *open* societies. Continued isolation describes a closed society. Mobility describes an open society. In Experiment 1, for instance, the memberships of each society did not change until the fourth epoch. Thereafter, the membership of each society changed with every epoch. This experiment thus presents a history where the course of change was from isolation to mobility.

The movement of people may be expected to lead to the movement of ideas, to the spread of culture from one society to another. Several such diffusions are illustrated in

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

TABLE 1. FOUR EXPERIMENTAL HISTORIES AND FOUR TYPICAL CULTURAL DEVELOPMENTS *



* Small letters represent particular individuals. Cultural responses are symbolized as follows: Invention: ◯; Culture borrowing: □; Habit: ⬡; and Culbit: △

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

Table 1. There is a belief that the spread of culture encourages cultural creativity, that invention is brought on in open societies and curbed in closed societies. Our experiments made it possible to see what actually happened by way of cultural expression as open and closed societies were variously combined in laboratory histories.

Experiments 1 and 2 were conducted to find out what would take place in laboratory cultures when people were confined for a while to closed societies and then permitted to move about from society to society. Experiment 3 moved persons from one closed situation to another closed situation. Experiment 4, by bringing people from open to closed societies, is the reverse of Experiment 2. Together these four experiments give some indication of what may be expected in laboratory cultures as isolation is abandoned (Experiments 1 and 2), as it is transfixed (Experiment 3), and as it is instituted (Experiment 4) as a structural feature of society.

The problems of the experiments were suggested by problems of history. Culture histories involve orders of events and relationships that transcend the experience, not only of single individuals, but also of single groups. Our studies have attempted to bring such historical orders within the scope of experimental inquiry.

TECHNIQUES

Each of the experiments was conducted in the following manner. Three groups of three persons each were located in separate rooms. Following a practice session on Inkblot Card 8, each group was presented with Card 9 to look at for eight minutes. During the first two minutes each person in a group recorded on an individual response sheet the concepts he was able to draw from the card. Talking was not allowed during these two minutes. During the remaining six minutes each of the three subjects in a group was given two minutes to talk about what he saw in the card. The order of this discussion was systematically rearranged in subsequent sessions repeating this sort of discussion. While one person was pointing out the concepts he derived from the card, the other two were free to indicate openly their agreement or disagreement with his views. In addition to these verbal responses they were asked to write down plus or minus signs on carbon copies of his individual response sheet to provide permanent records of their agreements or disagreements on each of his concepts. This recording technique assured the direction of attention of every person in a group towards every concept proposed by each person. After thus working with Card 9 for eight minutes each group worked with Card 10 in exactly the same fashion: two minutes were allotted to individual and private responses and six minutes were then devoted to social responses. A total of sixteen minutes thus spent on Rorschach Cards 9 and 10 completed the first period or epoch.

The procedure of each subsequent period was like that of the first: eight minutes of response to Card 9 were followed by eight minutes of response to Card 10. The only arranged changes throughout each experiment were changes in personnel of the miniature societies as indicated in Table 1.

Subjects were prepared for an experiment in a general instruction session in which they were told that they were about to participate in a study of group responses to Rorschach cards. They were showed Rorschach Card 8. At no time before or during the experiment were the words "culture," "habit," "culbit," or "invention" used by the experimenters. In the instruction session the timing and mechanics of recording responses were described. The subjects were told that they would be divided into groups that might work separately through several periods. Concerning responses to the inkblot cards, the following carefully worded statement was made: "You may be as specific or as general about the concepts you see as you want to be. You may suggest as many concepts as you want. As long as you see the concept you may suggest it. You should feel completely free to write down and present to your group any concept you see regardless of whether or not the concept is a new one or was suggested by someone else or yourself in an earlier session." Great care was taken during the experiments not to indicate what sorts of responses we were seeking.

An observer sat with each group for timing and recording. He never entered into the conversations except to give directions as to mechanics.

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

TABLE 2. CULTURAL RESPONSES TO SOCIAL SITUATIONS *

Experiments:		1				2				3				4			
Epoch	Society	Membership Type	Inkblot Card 9	Inkblot Card 10		Membership Type	Inkblot Card 9	Inkblot Card 10		Membership Type	Inkblot Card 9	Inkblot Card 10		Membership Type	Inkblot Card 9	Inkblot Card 10	
		Inventions:															
I	X		17	22			9	14			8	11			14	19	
	Y		12	14			3	4			11	16			10	12	
	Z		13	18			4	7			7	11			12	15	
II	X		9	11			9	12			1	5			2	4	
	Y		6	10			7	5			6	5			7	4	
	Z		5	3			5	6			4	6			4	5	
III	X	C_{11}	10	9			9	5			4	4			2	2	
	Y		3	4			3	4		C_{31}	4	10			1	2	
	Z		3	0			4	6			7	7			3	5	
IV	X		1	3		C_{21}	6	5			4	8		A_{41}	1	0	
	Y	B_{11}	4	2			5	5			6	12			1	2	
	Z		0	2			4	4			4	9			1	2	
V	X		4	2			6	7			4	4			1	2	
	Y		2	2			5	4		B_{31}	1	0			0	2	
	Z		1	3			3	3			3	6			1	1	
VI	X		4	1			1	0			2	0			0	0	
	Y	A_{11}	0	0		B_{21}	0	1			6	3			1	1	
	Z		1	0			2	1			6	7			0	2	
VII	X		0	2			2	1			6	2			1	0	
	Y		1	1			1	4		C_{35}	2	4			0	0	
	Z		1	0			1	1			9	7			1	1	
VIII	X						2	0			1	2		C_{41}	0	0	
	Y					A_{21}	2	1			6	2			4	2	
	Z						1	1			9	4			0	1	
IX	X						1	4			2	0			0	1	
	Y						1	0		B_{35}	1	1			1	0	
	Z						4	0			2	1			1	2	
		Habits:**															
II	X		8	7			6	5			6	9			12	12	
	Y		5	10			1	1			6	14			8	10	
	Z		12	14			0	1			4	7			8	13	
III	X	C_{13}	6	9			5	6			7	14			11	13	
	Y		15	19			7	4		C_{33}	14	6			11	13	
	Z		15	18			0	0			7	7			13	13	
IV	X		14	18		C_{23}	8	11			11	16		A_{43}	12	21	
	Y	B_{13}	16	20			6	6			2	3			11	14	
	Z		17	18			0	0			9	18			13	10	
V	X		15	18			4	4			8	18			14	21	
	Y		18	18			7	7		B_{33}	12	24			14	12	
	Z		15	20			0	0			21	23			10	15	
VI	X		17	22			15	15			9	23			15	18	
	Y	A_{13}	15	25		B_{23}	9	7			6	8			13	11	
	Z		15	20			12	0			15	19			13	16	
VII	X		18	24			11	12			12	21			14	18	
	Y		18	21			15	15		C_{37}	10	10			13	11	
	Z		16	15			15	16			16	18			11	17	
VIII	X						14	16			19	13		C_{43}	14	19	
	Y					A_{23}	12	14			9	15			13	12	
	Z						15	11			26	25			12	13	
IX	X						12	15			20	29			15	18	
	Y						12	15		B_{37}	15	20			13	14	
	Z						7	8			26	29			11	15	

Experiments:		1				2				3				4			
Epoch	Society	Membership Type	Inkblot Card 9	Inkblot Card 10		Membership Type	Inkblot Card 9	Inkblot Card 10		Membership Type	Inkblot Card 9	Inkblot Card 10		Membership Type	Inkblot Card 9	Inkblot Card 10	
		Culture Borrowings:**															
I	X		-	-			-	-			-	-			-	-	
	Y		-	-			-	-			-	-			-	-	
	Z		-	-			-	-			-	-			-	-	
II	X		5	3			1	1			6	5			1	5	
	Y		5	8			0	1			4	8			2	4	
	Z		6	13			0	2			5	7			5	5	
III	X		2	0			2	4			3	6			3	2	
	Y		3	7			1	2			8	1			6	8	
	Z		8	8			0	0			0	3			4	6	
IV	X	C_{12}	8	3			0	3			3	3			4	4	
	Y		4	2			0	1		C_{32}	1	0			3	3	
	Z		5	5			0	0			4	1			4	2	
V	X					C_{22}	2	1			1	4		A_{42}	2	6	
	Y		7	6			0	1			1	0			3	6	
	Z	B_{12}	9	10			1	0			2	2			4	4	
VI	X		6	9			0	3			4	2			0	1	
	Y		10	9			1	1		B_{32}	7	9			7	3	
	Z		9	7			1	3			6	7			4	2	
VII	X	A_{12}	4	8			3	5			5	5			1	2	
	Y		6	9		B_{22}	4	4			5	3			2	7	
	Z		11	9			5	6			1	4			3	6	
VIII	X						4	3			1	2			0	0	
	Y						1	3		C_{36}	5	5		C_{42}	2	1	
	Z						1	2			6	3			3	4	
IX	X					A_{22}	7	3			5	3			0	0	
	Y						6	4			6	10			1	2	
	Z						4	7			2	4			0	2	
		Culbits:**															
II	X		-	-			-	-			-	-			-	-	
	Y		-	-			-	-			-	-			-	-	
	Z		-	-			-	-			-	-			-	-	
III	X		2	2			0	1			5	5			2	6	
	Y	C_{14}	5	8			0	1			3	0			3	3	
	Z		5	12			0	0			4	1			2	4	
IV	X		8	14			2	1		C_{34}	9	10			6	7	
	Y	B_{14}	7	11		C_{24}	0	3			0	0		A_{44}	10	12	
	Z		6	7			0	0			3	8			2	7	
V	X		7	9			1	0			9	6			7	5	
	Y		13	14			0	2		B_{34}	10	13			12	19	
	Z		13	15			0	0			6	6			8	9	
VI	X		11	14			2	3			10	9			7	8	
	Y	A_{14}	20	15		B_{24}	2	4			8	7			12	21	
	Z		17	22			1	2			4	5			11	10	
VII	X		20	16			1	5			13	7			8	13	
	Y		23	26			2	5		C_{38}	15	13			20	24	
	Z		21	30			4	1			7	8			15	14	
VIII	X						7	8			18	9		C_{44}	12	13	
	Y					A_{24}	5	3			13	16			22	28	
	Z						2	7			5	11			20	18	
IX	X						4	5			20	23			10	13	
	Y						6	8		B_{38}	10	9			25	29	
	Z						4	6			14	11			21	19	

* Membership types with which cultural responses were associated: C: closed societies; B: new societies; and A: open societies. The responses in Type C_{11} were, for example, inventions in Experiment 1 associated with closed societies during Epochs II and III. Note that culture borrowings are treated as delayed responses to experience in preceding epochs.

** Borrowings and habits could not appear before Epoch II; culbits, which are habitually expressed borrowings, could not appear before Epoch III.

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

The subjects were students at the University of Colorado. No subject was used in more than one experiment. An effort was made to provide similar and constant conditions throughout the experiments except for changes in group memberships as outlined in Table 1.

ANALYSIS

Table 2 records the cultural responses that appeared in the four experiments. Table 2 also records classifications of social situations with which the responses were associated. A situation was treated as part of a closed society during any epoch in which the personnel was like that of the preceding epoch; it was treated as a new society during any epoch initiating a change of personnel; and it was treated as part of an open society during any epoch marked by a change of personnel that followed an epoch also marked by new or changed personnel. Closed societies are distinguished by lack of social change, new societies by unusual change, and open societies by usual or constant change. New societies end isolation and may start mobility. Table 2 shows that changes in invention and habit appear to have been expressed immediately in new societies, but that changes in culture borrowings occurred more notably in the epoch following contact with a new society. Borrowings thus appear to be delayed responses to experience in society; inventions, habits, and culbits appear to be contributions immediately offered to society. The delayed responses of borrowings were taken into consideration in our analysis of Table 2.

Table 3 presents a series of arguments on cultural response derived by inspection of Table 2. Hypotheses bearing on these arguments were subjected to statistical analysis, the results of which are recorded in Table 3. In testing hypotheses we chose Ackoff's Tests 4 and 17 for values of t and Test 19 for values of F.[4] These tests assume randomness, normality, and in Tests 17 and 19, equal variances. Normality, in particular, does not appear to be indicated by some of the samples. It is a matter of trust that the t-tests are not greatly disturbed by characteristics of the data that may not fit the assumptions. Responses to Inkblot Cards 9 and 10 were included together in some of the tested arrays in order to increase degrees of freedom.

Test 1 may be taken as an example of how to read Table 3. In Test 1 the null hypothosis, H_0, asserts that open society inventions arrayed in classifications A_{11}, A_{21} and A_{41} (and recorded in Table 2 in such magnitudes as 4, 2, 1, 4, 0, 1, 0, 1, etc.) represent a population with a mean value equal to or greater than the mean of a population represented by closed society inventions arrayed in C_{11}, C_{21} and C_{41} (and recorded in Table 2 in such magnitudes as 9, 6, 5, 10, 3, 3, etc.). The alternative hypothesis, H_1, is that the average number of inventions in open societies is less than the average in the closed societies (or that such an array as 4, 2, 1, 4, 0, 1, 0, 1, etc., is not likely to be randomly selected from a population that yields a random sample of such high values as 9, 6, 5, 10, 3, 3, etc.). The t-test (Ackoff's Test 17) yields for Test 1 a value of 2.855. This is greater than t″, which is the value of t at the 1 per cent level of significance indicated by 58 degrees of freedom (df). The 5 per cent level of significance utilized in other tests is symbolized by t′. Since t at 2.855 is greater than t″, the null hypothosis is rejected: the chances are less than one in a hundred that such an array of values for open society inventions would be drawn at random from a population of values whose mean was equal to or greater than that of the population represented by the sample of closed society inventions. The alternative hypothosis appears to be acceptable. Tests 1 and 2 tend to support Argument 1 that open societies curb invention more than closed societies. However, since the better designed and thus more critical Tests 3 and 4 oppose the argument, it is rejected.

Conclusions regarding the arguments on culture response are included in Table 3. The arguments thus tempered by statistical analysis are presented below. We should expect repetitions of the experiments under similar conditions to lead to similar findings.

Habits are copies of inventions. Culbits are copies of borrowings. Borrowings can be copies of inventions, habits and culbits. Our experiments are not designed to explore these

[4] Russell L. Ackoff, *The Design of Social Research*, Chicago: The University of Chicago Press, 1953, pp. 187, 200 and 202.

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

TABLE 3. TESTS OF HYPOTHESES ON CULTURAL RESPONSES TO SOCIAL SITUATIONS *

Arguments	Test	Inkblot Cards	Hypotheses Tested	Results
1. Open societies always curb invention more than closed societies.	1	9	H_o: A_{11}, A_{21} & $A_{41} \geq C_{11}$, C_{21} & C_{41} H_1: A_{11}, A_{21} & $A_{41} < C_{11}$, C_{21} & C_{41}	$t = 2.855 > t''$, df:58; reject H_o
Tests 1 and 2 support the argument: inventions tended to be plentiful in closed societies and rare in open societies. But the more discriminating Tests 3 and 4 oppose the argument: early and late inventions in open societies do not appear to be significantly less than early and late inventions in closed societies. Reject the argument.	2	10	H_o and H_1 are the same as in Test 1	$t = 3.118 > t''$, df:58; reject H_o
	3	9	H_o: A_{21} & $A_{41} \geq C_{21}$ & C_{41} H_1: A_{21} & $A_{41} < C_{21}$ & C_{41}	$t = 1.724 < t'$, df:43; reject H_1
	4	10	H_o and H_1 are the same as in Test 3	$t = 1.541 < t'$, df:43 reject H_1
2. Invention is always curbed in open societies.	5	9 & 10	H_o: $A_{11} \geq C_{11}$ H_1: $A_{11} < C_{11}$	$t = 13.685 > t''$, df:28; reject H_o
All of the tests support the argument; none of the open societies equaled the production of inventions that is possible in closed societies. Tests 7 and 8 are critical. Accept the argument.	6	9 & 10	H_o: $A_{21} \geq C_{21}$ H_1: $A_{21} < C_{21}$	$t = 5.895 > t''$, df:40; reject H_o
	7	9	H_o: $A_{41} \geq C_{21}$ H_1: $A_{41} < C_{21}$	$t = 4.187 > t''$, df:22; reject H_o
	8	10	H_o and H_1 are the same as in Test 7	$t = 3.593 > t''$, df:22; reject H_o
3. Entrance into new societies brings about immediate decreases in invention.	9	9	H_o: B_{11}, B_{21}, B_{31} & $B_{35} \geq C_{11}$, C_{21}, C_{31} & C_{35} H_1: B_{11}, B_{21}, B_{31} & $B_{35} < C_{11}$, C_{21}, C_{31} & C_{35}	$t = 4.732 > t''$, df:46; reject H_o
The tests support the argument. Accept the argument.	10	10	H_o and H_1 are the same as in Test 9	$t = 3.860 > t''$, df:46; reject H_o
4. Invention is fostered in closed societies that follow closed societies; it is curbed in closed societies that follow open societies.	11	9 & 10	H_o: $C_{35} \leq A_{21}$ H_1: $C_{35} > A_{21}$	$t = 3.773 > t''$, df:46; reject H_o
Test 11 demonstrates that inventions are significantly high in closed societies that follow closed societies. Tests 12 and 13 show that inventions are significantly low in closed societies that follow open societies. Accept the argument.	12	9 & 10	H_o: $C_{41} \geq C_{35}$ H_1: $C_{41} < C_{35}$	$t = 5.853 > t''$, df:40; reject H_o
	13	9 & 10	H_o: $C_{41} \geq A_{41}$ H_1: $C_{41} < A_{41}$	$t = 3.695 > t''$, df:46; reject H_o
5. Culture borrowing increases immediately following experience in new societies.	14	9 & 10	H_o: B_{12}, B_{22} & $B_{32} \leq C_{12}$, C_{22} & C_{32} H_1: B_{12}, B_{22} & $B_{32} > C_{12}$, C_{22} & C_{32}	$t = 6.053 > t''$, df:70; reject H_o
The test supports the argument. Accept the argument.				
6. The level of borrowing that is reached following experience in a new society is maintained through succeeding epochs of an open society.	15	9	H_o: $A_{12} = \bar{x}_{B_{12}}$ H_1: $A_{12} \neq \bar{x}_{B_{12}}$	$t = .000 < t'$, df:5; reject H_1
	16	10	H_o and H_1 are the same as in Test 15	$t = .470 < t'$, df:5; reject H_1
The tests, which relate borrowings in open societies to means of borrowings in new societies, support the argument. Accept the argument.	17	9	H_o: $A_{22} = \bar{x}_{B_{22}}$ H_1: $A_{22} \neq \bar{x}_{B_{22}}$	$t = .168 < t'$, df:5; reject H_1
	18	10	H_o and H_1 are the same as in Test 17	$t = 1.862 < t'$, df:5; reject H_1
7. The level of borrowing that is reached following experience in a new society is maintained through succeeding epochs of a closed society.	19	9 & 10	H_o: $C_{36} = \bar{x}_{B_{32}}$ H_1: $C_{36} \neq \bar{x}_{B_{32}}$	$t = 3.274 > t''$, df:17; reject H_o
The test, which relates borrowings in closed societies to a mean of borrowings in preceding new societies, opposes the argument. Reject the argument.				

* H_o: null hypothesis; H_1: alternative hypothesis; A, B and C: classifications of data in Table 2; t': t at the 5% level of significance; t'': t at the 1% level of significance; df: degrees of freedom; $\bar{x}$: mean; I: increase.

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

Table 3 continued

Arguments	Test	Inkblot Cards	Hypotheses Tested	Results
8. Habits are fostered more in open societies than in closed societies.	20	9	H_o: $A_{43} \leq C_{13}$ H_1: $A_{43} > C_{13}$	$t = .833 < t'$, df:16; reject H_1
Three of the tests seem to support the argument; three oppose it. Arguments 9 and 10 below lend support to this argument. Note that Argument 10 is not well established. This argument is questionable.	21	10	H_o and H_1 are the same as in Test 20	$t = .536 < t'$, df:16; reject H_1
	22	9	H_o: $A_{43} \leq C_{23}$ H_1: $A_{43} > C_{23}$	$t = 9.936 > t''$, df:22; reject H_o
	23	10	H_o and H_1 are the same as in Test 22	$t = 9.874 > t''$, df:22; reject H_o
	24	9	H_o: $A_{43} \leq C_{33}$ H_1: $A_{43} > C_{33}$	$t = 3.325 > t''$, df:19; reject H_o
	25	10	H_o and H_1 are the same as in Test 24	$t = 1.827 < t'$, df:19; reject H_1
9. The increase of habits in new societies is significantly greater than the increase of habits in closed societies.	26	9	H_o: I_{B13}, I_{B23}, I_{B33} & $I_{B37} \leq$ I_{C13}, I_{C23}, I_{C33} & I_{C37} H_1: I_{B13}, I_{B23}, I_{B33} & $I_{B37} >$ I_{C13}, I_{C23}, I_{C33} & I_{C37}	$t = 3.503 > t''$, df:58; reject H_o
The tests support the argument. Tests 26 and 27 show that increases of habits in new societies are greater than increases in habits in closed societies. Test 28 suggests that habits increase relatively more frequently in new than in closed societies. Accept the argument.	27	10	H_o and H_1 are the same as in Test 26	$t = 3.152 > t''$, df:58; reject H_o
	28	9 & 10	H_o: Increases of habits occur with the same relative frequency in closed as in new societies. H_1: Increases of habits do not occur with the same relative frequency in closed as in new societies.	$\chi^2 = 4.642$, df:1; reject H_o
10. Habits continue to range in open societies around levels reached in preceding new societies.	29	9	H_o: $A_{23} = \bar{x}_{B23}$ H_1: $A_{23} \neq \bar{x}_{B23}$	$t = .646 < t'$, df:8; reject H_1
Three of the tests, that compare habits produced in open societies to averages of habits produced in preceding new societies, support the argument. Since habits range widely in open societies, their occurence is only roughly predicted by the production of habits in new societies. Accept the argument with caution.	30	10	H_o and H_1 are the same as in Test 29	$t = 3.210 > t'$, df:8; reject H_o
	31	9	H_o: $A_{13} = \bar{x}_{B13}$ H_1: $A_{13} \neq \bar{x}_{B13}$	$t = 1.404 < t'$, df:8; reject H_1
	32	10	H_o and H_1 are the same as in Test 31	$t = 1.596 < t'$, df:8; reject H_1
11. Habits continue to range in closed societies around levels reached in preceding new societies.	33	9	H_o: $C_{33} = \bar{x}_{B33}$ H_1: $C_{33} \neq \bar{x}_{B33}$	$t = .168 < t'$, df:8; reject H_1
The tests conflict. Reject the argument.	34	10	H_o and H_1 are the same as in Test 33	$t = 2.463 > t'$, df:8; reject H_o
12. Habits continue to range closely in closed societies around levels reached in preceding open societies.	35	9	H_o: $C_{43} = \bar{x}$(habits, Epoch V, Experiment 4) H_1: $C_{43} \neq \bar{x}$(habits, Epoch V, Experiment 4)	$t = 1.084 < t'$, df:11; reject H_1
The tests support the argument: the number of habits expressed in the terminal epoch of an open society appears to be a good prediction of subsequent productions of habits in a closed society. Accept the argument.	36	10	H_o and H_1 are the same as in Test 35	$t = .984 < t'$, df:11; reject H_1
13. Culbits tend to increase relentlessly under all social circumstances.	37	9	H_o: $I_C = I_B = I_A$ H_1: any I $\neq$ any other I where increases of culbits are represented as follows: I_C: increases in closed societies, I_B: increases in new societies and I_A: increases in open societies.	$F = 1.310 < F'$, df: 2 and 186; reject H_1
The tests support the argument. Tests 37 and 38 indicate that increases of culbits are not significantly greater in new and open societies than in closed societies. Test 39 shows no significant differences in the count of increases in the three sorts of societies. Accept the argument.	38	10	H_o and H_1 are the same as in Test 37	$F = 2.824 < F'$, df: 2 and 186; reject H_1
	39	9 & 10	H_o: Increases of culbits occur with the same relative frequencies in closed, new and open societies. H_1: Increases of culbits do not occur with the same relative frequencies in closed, new and open societies.	$\chi^2 = .995$ df:2; reject H_1

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

functions extensively, and they are not analyzed here. Logically and perhaps actually they can confound our analyses of the relations of borrowings, habits and culbits to social situations. On this account several conceivable arguments on these dependent cultural responses are not attempted in Table 3.

FINDINGS

The following relations of culture to society appear to be indicated in the four experimental histories.

1. Invention is always curbed in open societies.
2. Entrance into new societies brings about immediate decreases in invention.
3. Invention is fostered in closed societies that follow closed societies; it is curbed in closed societies that follow open societies. It thus seems that the interference with invention of open societies carries forth into closed societies.
4. Culture borrowing increases immediately following experience in new societies.
5. The level of borrowing reached after experience in new societies is maintained in succeeding open societies but not in succeeding closed societies.
6. The increase of habits in new societies is greater than the increase of habits in closed societies.
7. Habits appear to range widely in open societies around levels reached in preceding new societies; they range closely in closed societies around levels reached in the terminal epochs of preceding open societies.
8. Culbits tend to increase relentlessly regardless of social circumstance.

In general, as mobility follows isolation, borrowing displaces invention; as a new order of isolation succeeds an old order of isolation, both borrowing and invention are maintained; and as isolation displaces mobility, both borrowing and invention disappear.

The relations of habits and culbits to social situations are not clear. Culbits especially reveal no direct relations. Since habits tend to hold level under some social circumstances and culbits tend generally to increase, they each display unique patterns of cultural response. Thus habitual copies of inventions and habitual copies of borrowings appear as different cultural phenomena.

The succession of closed societies of Experiment 3 stands out as an experimental history that favored creativity in culture.

COMMENT

Swanson has argued persuasively in favor of laboratory experiments in sociology.[5] Keesing has noted that experimental studies of culture are in the making.[6] Bartlett's studies of remembering[7] and Larsen's study of rumor[8] may be taken as examples of laboratory investigations having to do with cultural processes. Robert's investigation of three Navaho families represents a field record of the culture of small groups.[9] Experimental approaches to culture have been started.

This study of experimental histories of culture is a first attempt at the outright production of culture in the laboratory. As contrasted with the studies of rumor that treat of the wearing away and distortion of culture that proceed as each rumor advances farther and farther away from its source and referent, this has been an investigation of provocations of cultural *development*. We found marked effects of social structure on cultural development.

Experimental controls and simplifications always produce toys. Every experiment, regardless of subject or technique, is a delicate toy in which carefully selected and manipulated mechanisms are operated under arranged conditions. These toys may or may not be replicas of uncontrolled actualities found outside of the laboratory. And they may or may not work outside of the laboratory. Our miniature histories were ar-

---

[5] Guy E. Swanson, "Some Problems of Laboratory Experiments with Small Populations," *American Sociological Review*, 16 (June, 1951), pp. 349–358.

[6] Felix M. Keesing, "Culture Change, An Analysis and Bibliography of Anthropological Sources to 1952," *Stanford Anthropological Series*, No. 1, 1953, p. 76.

[7] F. C. Bartlett, *Remembering. A Study in Experimental and Social Psychology*, New York: Cambridge University Press, 1932.

[8] Otto N. Larsen, "An Exploration of the Accuracy of Message Content in Rumor Chains," Mimeographed Report, Washington Public Opinion Laboratory, Spring, 1952.

[9] John M. Roberts, "Three Navaho Households: A Comparative Study of Small Group Culture," *Papers, Peabody Museum of American Archaeology and Ethnology*, Vol. 40, No. 3, 1951.

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions

ranged as replicas of commonplace social situations conducive to cultural production. Since cultural phenomena were actually brought about in the experiments and not merely simulated, the miniature histories appear to be operational replicas. The matter of these particular replicas working outside of the laboratory has not been established.

But the experiments do raise questions as to the actual workings of culture in history. Our most disturbing discovery was the creativity of isolated groups. The stimulation and novelty of experience in open social settings did not increase cultural creativity in the experiments. The experimental demonstration of the coincidence of social closure with cultural invention poses the problem of the extent of their association in history. There are plausible examples of socially restricted creativity in schools of art and thought, in golden ages and recurrent clusterings of all sorts of distinguished achievement. But the great example of mobile and cosmopolitan urban populations having made the most of cultural change runs counter to our experimental results. We should hesitate to extend these results without qualification to a general interpretation of all cultural accomplishment. However, our results do give reason to question any bland presumption that social mobility leads inevitably to cultural creativity. We should now be more careful to search for explicit circumstances under which either isolation or mobility may contribute to the production of culture.

DIFFUSION IS PREDICTABLE: TESTING PROBABILITY MODELS FOR LAWS OF INTERACTION *

STUART CARTER DODD
Washington Public Opinion Laboratory

WHAT FACTORS AFFECT DIFFUSION? THE DIMENSIONAL CANDIDATES

THE Air Force has dropped several billion leaflets in wartime—with effects that are not precisely known. It will be responsible for further leaflet drops in future conflicts. It needed research, therefore, on how to maximize the diffusion of leaflet messages and compliance with their instructions by the target populations. It wanted to learn the generalizable and manipulatable conditions for predicting and producing diffusion and compliance. This leaflet project on message diffusion offered the Public Opinion Laboratory resources for exploring its dimensional analysis and the interactance hypotheses part of it, through controlled experiments.

Message diffusion is but a one-way person-to-person form of interaction. Message diffusion is, furthermore, an observable and experimentable sub-form of social or cultural diffusion in general. Our interactance formula,[1] or general model, for any single kind of group behavior-in-context analyzes human interacting into six dimensions or classes of factors. The simple group behavior of spreading an attribute (defined as any all-or-none characteristic) was here studied as an example of a unified field of social

* Revised version of paper read at the American Sociological Society meetings, September, 1954.

This research was supported in part by the United States Air Force under Contract AF 33 (038)–27522, monitored by the Human Resources Research Institute (now, Officer Education Research Laboratory, Air Force Personnel and Training Research Center), Air Research and Development Command, Maxwell Air Force Base, Alabama. Permission is granted for reproduction, translation, publication and distribution in part and in whole by or for the United States Government.

[1] S. C. Dodd, "The Interactance Hypothesis—A Gravity Model Fitting Physical Masses and Human Groups," *American Sociological Review,* 15 (April, 1950), pp. 245–256. The fuller development of dimensional analysis in the social sciences, of which Project Revere was an item, may be found in the author's *Dimensions of Society,* New York: Macmillan, 1942; and *Systematic Social Science,* Seattle: University Bookstore, 1947. The details of the researches reviewed here may be found in the 44 published articles (bibliography on request).

This content downloaded from 202.28.191.34 on Sun, 31 Jan 2016 04:36:14 UTC
All use subject to JSTOR Terms and Conditions